LISTING OF THE CLAIMS

The following is a complete listing of claims with a status identifier in parentheses.

Listing of the Claims

1. (PREVIOUSLY PRESENTED) A high-efficiency synthesis method of a carbon nanostructure, the method comprising: bringing raw material gas and a catalyst into contact with each other under reaction conditions so as to produce a carbon nanostructure, wherein:

initiation of the contact between the raw material gas and the catalyst is carried out instantaneously.

2. (PREVIOUSLY PRESENTED) The method according to claim 1, wherein:

the initiation of the contact is carried out instantaneously in such a manner that feed of the raw material gas to the catalyst that is stationary is initiated instantaneously.

3. (PREVIOUSLY PRESENTED) The method according to claim 1, wherein:

the initiation of the contact is carried out instantaneously in such a manner that under a condition where the raw material gas is circulated, the catalyst is caused to move from outside the raw material

gas to inside the raw material gas.

4. (PREVIOUSLY PRESENTED) The method according to claim 1, wherein:

the contact is instantaneously initiated in such a manner that under a condition where the raw material gas is built up, the catalyst is caused to move from outside the raw material gas to inside the raw material gas.

5. (PREVIOUSLY PRESENTED) The method according to claim 1, wherein:

the contact is instantaneously initiated under the reaction conditions in such a manner that under a condition where the catalyst is placed in the raw material gas that is built up, a temperature of the catalyst or a temperature in a vicinity of the catalyst is instantaneously increased to a reaction temperature.

6. (PREVIOUSLY PRESENTED) The method according to claim 1, wherein:

stopping of the contact between the raw material gas and the catalyst under the reaction conditions is carried out instantaneously.

7. (PREVIOUSLY PRESENTED) A high-efficiency synthesis method of a carbon nanostructure, the method comprising: feeding carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, wherein:

in initiating the feed of the raw material gas, the raw material gas is instantaneously fed by a predetermined flow quantity.

8. (PREVIOUSLY PRESENTED) A high-efficiency synthesis method of a carbon nanostructure, the method comprising: feeding carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, wherein:

a total flow quantity of the carrier gas and the raw material gas is controlled to be constant all the time in such a manner that in instantaneously initiating feed of the raw material gas of a predetermined flow quantity, a flow quantity of the carrier gas is instantaneously decreased proportionately, whereas in instantaneously interrupting feed of the raw material gas, a flow quantity of the carrier gas is instantaneously increased proportionately.

9. (PREVIOUSLY PRESENTED) A high-efficiency synthesis method of a carbon nanostructure, the method comprising: feeding carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, wherein:

a total flow quantity of the carrier gas and the raw material gas is controlled to be constant all the time in such a manner that in a reaction process, feed flow quantity levels of the raw material gas are changed in a plurality of levels, and when the feed flow quantity of the raw material gas is instantaneously increased or decreased by some quantity, a feed flow quantity of the carrier gas is instantaneously decreased or increased proportionately.

10. (PREVIOUSLY PRESENTED) A high-efficiency synthesis apparatus of a carbon nanostructure, which feeds carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, the apparatus comprising:

means for feeding, to the reaction chamber, the carrier gas which is controlled to be of a basic flow quantity; and

an electromagnetic three-way valve which instantaneously feeds or interrupts the raw material gas which is controlled to be of a predetermined flow quantity, with respect to the reaction chamber, wherein:

at the time of interrupting the raw material gas, the electromagnetic three-way valve is instantaneously switched to exhaust position so that feed of the raw material gas is interrupted, and at the time of feeding the raw material gas, the electromagnetic three-way valve is instantaneously switched to feed position so that the raw

material gas of a predetermined flow quantity is fed to the reaction chamber.

11. (PREVIOUSLY PRESENTED) A high-efficiency synthesis apparatus of a carbon nanostructure, which feeds carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, the apparatus comprising:

means for feeding, to the reaction chamber, the carrier gas which is controlled to be of a basic flow quantity;

a first electromagnetic three-way valve which instantaneously feeds or interrupts the raw material gas which is controlled to be of a predetermined flow quantity, with respect to the reaction chamber; and

a second electromagnetic three-way valve which instantaneously feeds or interrupts the carrier gas whose flow quantity is controlled to be the same as the predetermined flow quantity of the raw material gas, with respect to the reaction chamber, wherein:

a total flow quantity of the carrier gas and the raw material gas, which is fed to the reaction chamber including the carrier gas of the basic flow quantity, is controlled to be constant in such a manner that at the time of feeding the raw material gas with the first electromagnetic three-way valve, the carrier gas is interrupted with the second electromagnetic three-way valve, and at the time of interrupting the raw material gas with the first electromagnetic three-way valve, the carrier

gas is fed with the second electromagnetic three-way valve.

12. (PREVIOUSLY PRESENTED) A high-efficiency synthesis apparatus of a carbon nanostructure, which feeds carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, the apparatus comprising:

means for feeding, to the reaction chamber, the carrier gas which is controlled to be of a basic flow quantity;

a plurality of first electromagnetic three-way valves, provided in parallel with each other, which instantaneously feed or interrupt the raw material gas at respective feed flow quantity levels, so that feed flow quantity levels of the raw material gas are changed in a plurality of levels; and

a plurality of second electromagnetic three-way valves, provided in parallel with each other, which instantaneously feed or interrupt the carrier gas at respective feed flow quantity levels with respect to the reaction chamber, so that feed flow quantity levels of the carrier gas are changed in a plurality of levels that are numerically equal to the feed flow quantity levels of the raw material gas, wherein:

a total flow quantity of the carrier gas and the raw material gas, which is fed to the reaction chamber including the carrier gas of the basic flow quantity, is controlled to be constant in such a manner that at the time of gas feed, at least one necessary electromagnetic three-way

valve among the first electromagnetic three-way valves and the second electromagnetic three-way valves is switched to gas feed position, and the other electromagnetic three-way valves are switched to gas interruption position.

13. (PREVIOUSLY PRESENTED) A carbon nanostructure which is produced by using the high-efficiency synthesis method of a carbon nanostructure according to claim 1.

14. (PREVIOUSLY PRESENTED) The carbon nanostructure according to claim 13, which is a brush-type carbon nanotube and is realized by a high-purity carbon nanotube, grown with high density, mainly composed of graphene sheets in an outermost layer of the carbon nanotube.

15. (PREVIOUSLY PRESENTED) The carbon nanostructure according to claim 14, wherein:

the growth is completed within 100 seconds.

16. (PREVIOUSLY PRESENTED) The carbon nanostructure according to claim 14, wherein:

when the brush-type carbon nanotube is cleaved in arbitrary cross section, there appear thread-type carbon nanotubes in the cross

section.

17. (PREVIOUSLY PRESENTED) The method according to claim 2, wherein:

stopping of the contact between the raw material gas and the catalyst under the reaction conditions is carried out instantaneously.

18. (PREVIOUSLY PRESENTED) The method according to claim 3, wherein:

stopping of the contact between the raw material gas and the catalyst under the reaction conditions is carried out instantaneously.

19. (PREVIOUSLY PRESENTED) The method according to claim 4, wherein:

stopping of the contact between the raw material gas and the catalyst under the reaction conditions is carried out instantaneously.

20. (PREVIOUSLY PRESENTED) The method according to claim 5, wherein:

stopping of the contact between the raw material gas and the catalyst under the reaction conditions is carried out instantaneously.

*** END CLAIM LISTING ***